

Claim 118
118. The process of claim 112 wherein the non-catalytic reagents would include hydroxyl and alkoxy bonded trivalent, pentavalent and tetravalent atoms.

REMARKS

Applicant would like to thank the Examiner for the courtesy extended to Applicant's undersigned representative during the Examiner Interviews of June 19, 2002, and August 20, 2002.

Election

The Examiner has required restriction under 35 U.S.C. 121, and Applicant acknowledges that restriction but believes it is no longer applicable given the amendments submitted herewith showing new claims. Applicant reserves the right to file a divisional application directed toward the non-elected invention.

In The Drawings

Additional Formal Drawings will be submitted upon claim allowance.

Status Of Claims

Claims 58, 64, 69 and 71 were withdrawn. Claims 46-57, 59-63, 65-68 70 and 71 are hereby canceled. New claims 72-118 are the currently pending independent claims.

Applicant Response To Rejection Under 35 U.S.C. 112

As discussed in the Examiner Interview, support for "exothermically reacting said one or more molecules with said wood cellulose" (*see e.g.* claims 46 & 65) can be found in the specification on page 22, at lines 4-8.

Figures 6, 7, 8, and 10 show allignment of the solute compounds with the matrix formed by the wood cellulose during the bonding process which disclosure is captured in claims 46 and 65 of

the prior claims and show “one or more molecules are cross linked to the wood cellulose”. In the new claims this is more particularly claimed as the resulting cyclic and cojoined or interlocking cyclic compounds formed with the wood cellulose as are particularly shown in Figure 6 and 6A and more generally in Figure 7, 8d, 10c, and more particularly again in Figure 11 (b1) and 11 (b2) and Figure 12b and c as well as in Figure 15 and 16 generally.

Applicant's Response To Rejections Under 35 U.S.C. 102(b):

Introduction

Each of the independent claims, recite common elements, for example:

1. hydrophilic organic solvents
2. non-oligomerized (monomer) reactants
3. covalently bonding the solute compound to the hydroxyl groups of the wood cellulose, and
4. bonding molecules of said solute compound to one another.

Additionally recited claim elements may include:

5. spontaneous, exothermic reaction without adding heat;
6. alignment of the bonding atoms with the wood cellulose matrix during the bonding process;
7. the use of catalysts (created in situ in the wood cellulose) for driving the reaction.

Applicant claims are distinguished over each of the cited documents individually and in combination. Traverse in this regard is presented in detail below. Thus, Applicant respectively submits that none of the cited documents whether considered individually or

in combination disclose, teach, suggest or motivate Applicant claimed invention which utilizes a hydrophilic organic solvent in which the claimed solute is exposed to the wood cellulose where reaction does not occur outside of the wood (does not create stable oligomers outside of the wood) and wherein said solute exothermically reacts with the hydroxyl groups of the wood cellulose forming covalent bonds and wherein said solute molecules also covalently react with one another.

Thus, Applicant submits that the claimed invention is not anticipated and is not obvious over the cited documents. Applicant respectfully requests that all rejections under 35 U.S.C. 102 and 103 be withdrawn.

To elaborate, the cited documents exemplify different methods of creating non-reactive solutions (for example; stable “cured” oligomers and oxygenated polymers, such as, SiO_2) which require supplemental heat or other destabilizing energy to infuse a treatment into the wood. In contrast, Applicant’s claimed invention specifies that the claimed solution uses an exothermic reaction to covalently bond the claimed compound with the hydroxyl groups of the wood. Applicant’s claimed hydrophilic solution is readily adsorbed by the wood. Applicant’s claimed process is safe for the wood and does not require endothermic energy as disclosed by the technologies of the cited documents.

Applicant’s claimed invention does not require pores in the wood of the type required by hydrophobic silicone formulations which are available as emulsions or slurry. Applicant claimed invention recites a solution which penetrates wood through migration from a solvent into the wood and reacts with wood cellulose (as well as other of the claimed compound molecules). Applicant’s asserts that none of the cited documents

disclose treatments that would form permanent bonding of applicant claimed compound to the interior and surface of the wood (or wood products), spontaneously, by contact.

Applicant's claimed invention is also distinguished by incorporating a soluble boron reagent to the formulas that would react with wood cellulose and lignins in a manner similar to silicon; thus forming a silicon-boron matrix in the wood further contributing to termite protection and fire retardancy. The cited document infused unreacted boron acids into the wood without fixing those in the wood using a covalently bonded shield.

Applicant's solvents are non-reacting. They are non-reactive hydrophilic solvents to allow penetration of reactive reagents to deep within (i.e. interior) of both wet and dry wood.

Exposure of wood to neat MTS may be dangerous due to excessive formation of gaseous hydrochloric acid that may hurt handlers and may degrade wood. Exposure to neat trimethylborate may result in excessive drawing in of moisture by the treated wood from the environment because the *hygroscopic conditions that would exist*

Applicants claimed invention is distinguished over the use of the non-hydrophilic solvents (such as gas and benzene). The cited documents do not disclose Applicants claimed invention. Such disclosures teach away from Applicant's invention since protection of the wood is the desired end result.

Claims are directed toward the combination of this treatment with enhancing chemicals (such as boric acid) which may otherwise be leached from the wood to seal the other chemicals into the wood. The use of Applicant's invention to trap other compounds within the wood by the resulting matrix is distinguished from the disclosures of the cited documents which would be inoperable to achieve Applicants claimed invention.

Applicant's claimed invention differs from the disclosure of the cited documents with respect to the chemical composition with respect to the following, e.g.,:

- (1) The composition is chemically well defined and identified,
- (2) The composition does not make use of aqueous solutions; an anhydrous organic solvent is required for the composition, although some water may be present, it interferes with the reaction,
- (3) Applicant's claimed solvent is hydrophilic,
- (4) The composition enters wood without prior conditioning of the wood,
- (5) The composition diffuses to interior of wood efficiently and instantly reacts with wood hydroxyl groups on contact and activates accompanying reagents to form silicon-oxygen covalent bonds not only on the surface but also within the wood (all areas of contact),
- (6) The composition requires no prior drying of wood or no drying or heating of wood after treatment to be effective, and

(7) Applicant's claimed exothermic reaction produces covalent bonds between the claimed compound and the wood cellulose, as well as covalent bonds between molecules of the claimed compound.

Applicant Additional Traverse Distinguishing Over Cited Documents

Saka

Claims 46-53, 55-57, 61, 63 and 65-68 have been rejected under 35 USC 102(b) as being anticipated by Saka.

Saka discloses a different technology and process than that claimed by Applicant.

Applicant claims a process for treating wood cellulose having a plurality of hydroxyl groups comprising the steps of:(1) providing a solution consisting essentially of
(a) a non-water-based hydrophilic organic solvent and
(b) a solute compound having a functional group which includes
(i) an atom selected from the group consisting of tetravalent and pentavalent atoms, which atom is bonded to

(A) a halogen atom or
(B) a functional group selected from the group consisting of a hydroxyl group, alkoxy group, phenoxy group, benzyloxy group and an aryloxy group having a polycyclic aromatic ring,
(c) said solute compound remaining essentially unreacted into stable oligomers prior to the addition of said solution to a wood having said wood cellulose,
(2) applying said solution to the wood cellulose; and simultaneously diffusing said

solution within said wood and

(3) reacting said solute to form covalent bonds with other molecules of said solute

and

(4) covalently bonding said solute to said wood cellulose, whereinsaid reacting is a reaction process that does not require the addition of heat and is exothermic.

Saka teaches the creation of an oligomer and impregnating of wood with a solution of a methylsiloxane oligomer containing phosphorus and/or boron. (see Saka, col. 2, lines 23-52).

Saka teaches away from functional disclosure by eliminating the reactive monomers which are used to form the cyclic rings on the matrix defined by the cellulose as shown in the Figures 6a and 6b.

Saka fails to react exothermically reacting for several reasons, one of which being that the oligomers cannot line up with the atoms in the wood easily because of the need to structurally align the oligomer and because the oligomer is non-reactive without heat and pressure.

After creation of the oligomer, Saka engages in a three step process which involves impregnation followed by subsequent hydrolysis or pyrolysis and then a following polycondensation reaction. Saka teaches a preferred embodiment by impregnating wood with a methylsiloxane oligomer containing phosphorus and/or boron and a silicon atom having at least two methyl groups directly attached thereto, subjecting the oligomer within wood cell voids to hydrolysis or pyrolysis and effecting polycondensation, there is formed a phosphorus oxide and/or boron oxide which is chemically bound in a water

repellent methylsilicone resin and a cured product or gel thereof. (see Saka, col.3, lines 20-36).

Because Saka forms oligomers outside of the wood, the practical affect is to stop the spontaneous reaction by trying to force chains, as opposed to individual one reactant trivalent, tetravalent or pentavalent atom molecules, in perfect alignment with the cellulose. By conducting this reaction within the wood, applicant creates his bonding product on a template defined by the wood thereby ensuring alignment of short compounds.

Saka prevents this formation by making the oligomers outside of the wood.

As shown in Claim 61, in Applicant's patent, the "initial covalent bonds" are aligned with the wood cellulose to which they bond.

Saka's recitation of in cell walls refers to voids in the wood (see Saka, col. 3, lines 20-36). The Saka technology fills the gaps and voids in wood with the disclosed oligomer or oligomer solution, but no reaction occurs with the cellulose upon the filling of the void of the wood. This is evidenced in Saka's disclosure that:

Next, the wood impregnated with the methylsiloxane oligomer and aged is dried at a temperature at which the wood does not undergo pyrolysis, preferably 50 degree to 110 degree C (see Saka, Col. 5, lines 1-14).

Saka states "wood impregnated with the methylsiloxane oligomer and aged is dried at a temperature at which the wood does not undergo pyrolysis". Thus Saka teaches away from Applicant's invention; states that no reaction occurs upon impregnation; does not teach an exothermic reaction; and is a different technology than

Applicant's claimed invention. Not only does Saka not teach all of the elements of Applicant's claimed invention, Saka's two step process does not teach, motivate, suggest or predict the likelihood of success of Applicant's claimed invention.

Further, and different from Applicant's claims reciting "... applying said solution to wood cellulose; and exothermically reacting said compound with said wood cellulose to covalently bond ...", Saka discloses that after impregnation, the oligomer is subject to hydrolysis or pyrolysis, which is then followed by a polycondensation reaction (resulting in curing of the oligomeric treatment). As a result, a methyl-silicone resin containing incombustible phosphorus oxide and/or boron oxide is formed in "cell walls" (see Saka, col. 2, lines 52-57). Again, Saka's recitation of in cell walls refers to voids in the wood (see Saka, col. 3, lines 20-36).

Saka discloses that

In the drying step, the oligomer cures through hydrolysis or pyrolysis and subsequent polycondensation, converting into a methylsilicone resin containing phosphorus oxide and/or boron oxide. The hydrolysis step may be promoted by an acidic or basic catalyst, metal organic acid salt or organometallic compound or a mixture of such catalysts. Typically, wood is impregnated with a methylsiloxane oligomer solution, kept therein for about 1 to 7 days under a vacuum of 10 to 15 mm Hg at room temperature, taken out of the solution, allowed to stand at room temperature for about one day, and heat dried at 50.degree to 110 degree C for about 1/2 to 2 days. (see Saka, Col. 5, lines 1-14).

After, and separate from, Saka's impregnation of the wood voids, Saka teaches a reaction of hydrolysis or pyrolysis that is followed by a polycondensation reaction. Saka's process requires "preferably 50 degree to 110 degrees C (see Saka, Col. 5, lines 1-14). These conditions support the reaction series which occurs separately from and after impregnation.

With regard to Saka's different reaction, the disclosure teaches that whether it is Saka's formula (1) or (2) [(1) $(CH_3SiO_{3/2})_m(MO_{3/2})_n$; (2) $[CH_3SiO_{3/2}]_x[(CH_3)_aSiO_{(4-a)/2}]_y[MO_{3/2}]_z$ (see Saka, col. 2, lines 23-52)], The oligomer is terminated with a hydroxyl group and/or an alkoxy group of 1 to 4 carbon atoms. (see Saka, col. 4, lines 12-19). Saka goes on to teach that preferably the methylsiloxane oligomer has an average degree of polymerization of 2 to 50, preferably 2 to 20 (see Saka, col. 4, lines 20-21). Saka's Example 1 discloses an average degree of polymerization of about 4 and was terminated with a methoxyl group (see Saka, col. 5, lines 35-36), while Saka's Examples 2, 3, 4, 5, 6 and 7 recite an average degree of polymerization of about 6 and was terminated with a methoxyl group and a hydroxyl group (see Saka, col. 6, lines 43-44, col. 6, lines 66-67, col. 7, lines 26-27, col. 8, lines 1-2, col. 8, lines 28-29, and col. 8, lines 28-29).

Applicant's reaction employs different reactants. Different from Saka, Applicant's inventive process claims as a reactant the "wood cellulose". Applicant claims "... applying said solution to wood cellulose; and exothermically reacting said compound with said wood cellulose to covalently bond ..."

Differently, Saka teaches a chemistry in which the reaction does not involve wood cellulose as a reactant. Further, the reaction does not employ the wood cellulose as a means to terminate Saka's reaction. Saka's reaction occurs by means apart from the wood. Applicant's claimed invention employs a different principle of operation, different chemistry and different process steps from those disclosed by Saka or any of the other cited documents.

Thus, there is no *prima facie* case of anticipation and no *prima facie* case of obviousness over Saka or any combination of references including Saka. Applicant respectfully requests that the rejections under 35 U.S.C. § 102 and 103 over Saka alone or in a combination including Saka be withdrawn.

Applicant respectfully submits that the process recited by Saka is different from Applicant claimed invention. Saka technology uses impregnation of wood with a methylsiloxane oligomer which contains phosphorous and/or boron. These are high molecular weight co-polymers that need to be prepared separately (outside the wood) from trialkoxysilanes and other reagents by heating and diluting. Differently, the material to be applied on to wood is not an alkyltrialkoxysilane, but a pre-prepared copolymer of unknown composition. The wood to be treated under Saka will have to be moisture conditioned first by soxhlet extraction with acetone, a very expensive procedure, followed by exposure to moisture to achieve the desired water content. This conditioned wood is then dipped for three days in the oligomer formula in methanol under vacuum.

Essentially the oligomer is forced to be drawn into the pores of wood by mechanically applied vacuum and the methanol is simultaneously removed.

No significant instant reaction and covalent bond formation appear to occur with Saka's. Instead, the wood undergoes heat treatment at 65 degrees for one day and then at 105 degrees for another day. This wood had a weight gain of 11.3%; however on exposure to water for four hours silicon was leached out indicating that the silicon is not bonded to the wood in spite of prolonged and expensive curing of the wood at high temperatures after treatment. Applicant's claims an exothermic reaction resulting in covalent bonds. Saka forces the creation of oligomers prior to the application of Saka mixture of the wood. Saka technology does not function in the manner of the invention claimed by Applicant. Applicant solution is stable and does not experience reaction prior to application to the wood. Saka technology of using the silicon oligomers (prepared separately outside the wood) followed by curing the wood at high temperatures to obtain fire retardency is not similar or pertinent to the technology recited in this application.

Applicant respectfully submits that Saka does not disclose expressly or inherently all of the elements of Applicant claimed invention. Further, there is no teaching, suggestion or motivation to practice Applicant claimed invention. Thus, Applicant respectfully request the withdrawal of the instant rejection under 35 U.S.C. 102(b) over Saka.

Maciejewski

Claims should not be rejected under 35 U.S.C. 102(b) over Maciejewski.

Applicant disclose covalently bonding the claimed compound to the wood cellulose throughout the wood by means of hydroxyl replacement in an exothermic reaction.

It is alleged that Maciejewski teaches treating wood with methyltrichlorosilane in an organic solvent such as toluene.

Like Saka, Maciejewski teaches the use of a mixture of methylsiloxane, phenylsiloxane and vinyltrichlorosilane in toluene with subsequent curing to make a coating on metal, concrete or wood. The mechanism of this coating involves co-polymerization of the vinylsilane with the siloxanes on curing on the surface of the metal, concrete or wood. The reagent does not react with the metal, concrete or wood but forms a coating on the surface only.

Toluene disclosed by Maciejewski is a hydrophobic solvent. It repels water and consequently cannot penetrate or allow penetration into the wood unless the wood is dried. As such, the coating occurs only on the surface, whereas Applicant's claimed invention claims a hydrophilic organic solvent which contains a claimed compound which reacts with wood irreversibly in all parts of both dry and wet wood.

Applicant further asserts that Maciejewski expedient of using tri-methylborate (or as cited in paragraphs 10 and 11 trimethylborate or methyltrichlorosilane) to treat wood does not disclose the recitations of Applicant claims which recite a hydrophilic organic solvent to dilute the reactants and to carry out the reaction where the reactants are dissolved from the organic solvent to the wood moisture.

The use of straight methyltrichlorosilene or similar reagents would damage the wood and leave damaging amounts of reagents may contact with the wood or the environment. In contrast, Applicant claimed invention results in a covalently bonded product, not harmful to the wood, with little or no waste in contact with the wood or environment.

Applicant respectfully submits that the technologies described in the application and the cited prior art are different in both composition and mechanism of action. In view of the above, Applicant respectfully requests the withdrawal of the instant rejection under 35 U.S.C. 102(b).

Nasheri

Claims 46-49, 61, and 65-66 have been rejected as allegedly anticipated under 35 USC 102(b) over Nasheri.

The disclosed Nasheri technology is fundamentally different from the exothermic reaction of trimethylborate and cellulose as claimed by Applicant.

As shown in the amended claims and as taught by Nasheri, without a catalyst a (strong acid directly added or made within the wood, or by methyl tri-chlorosilane) Nasheri does nothing more than put boric acid in the wood. This would be a step which would be done prior to the claimed invention of Applicant (See claims 39 and 40).

Nasheri does not disclose the reaction claimed by Applicant. It does not use an activator to activate simultaneously the silicon and boron additive for reaction with the

hydroxyl groups of wood molecules. Nasheri does not teach a method of bonding the boron atoms to cellulose and as to one another as claimed by Applicant.

Applicant's claimed invention recites trivalent (such as boron), tetravalent (such as silicon), where the claimed atoms are bonded to a halogen atom or bonded to a functional group selected from the group consisting of a hydroxyl group, alkoxy group, aryloxy group. Such recitations do not appear to be disclosed by the cited documents.

While Nasheri may add 1% Boron to wood, there is no disclosure of the covalent reaction of boron analogous to the reaction of Applicant claimed compounds bonded to the claimed functional groups, (or silicone or any other of the specified atoms) to the wood, nor does Nasheri teach covalently bonding to the wood and to one another. Two products (wood and boron) in Nasheri are not related to Applicant's claims reciting covalent bonding (e.g., see claim 53).

Nasheri introduces the boron product through drying the wood so that the wood absorbs the liquid mixture as opposed to the process which is disclosed by Applicant which uses the moisture in the wood to draw a reactive compound out of solution. The exothermic reaction claimed by Applicant is also not disclosed, taught or suggested by Nasheri.

Nasheri technology needs the wood to be dried prior to treatment and does not provide a technology to bond boron to wood that would not leach out. Further, Nasheri technology does not provide a method to simultaneously bond both boron and silicon to wood at points of contact of both dry and wet wood without pre-treatment.

Applicant respectfully submits that not all of Applicant claimed elements are disclosed by Nasheri. Further, the reference teaches away from Applicant claimed invention. Thus, Applicant respectfully requests that the instant rejection under 35 U.S.C. 102(b) be withdrawn.

Stabnikov

Claims 46, 59, 61, 65 and 70 have been rejected under 35 U.S.C. 102(b) as allegedly anticipated by the study described in the Stabnikov publication.

Applicant's claimed solution is hydrophilic and the reagents are drawn in to the interior of wood and treats all parts of wood.

The Applicant respectfully submits that the formula used by Stabinikov for Water-repellency treatment of lumber is different from Applicant claimed invention. For example Stabnikov discloses:

- A single reagent methyltrichlorosilane in gasoline,
- Gasoline is a solvent that is hydrophobic, and

64. Gasoline is repelled from wood containing moisture and therefore cannot penetrate the wood.

The Stabinikov formula does not provide moisture preservation and Stabnikov concludes that the results are not complete and does not affirm that the given problem has been resolved.

Applicant's claimed invention comprises a stable mixture of an activator, a silicon reagent and a boron reagent in a hydrophilic organic solvent that is not repelled by wood

moisture. Unlike Stabnikov disclosure which treats wood only on the exterior due to hydrophobicity of the gasoline based formula.

There are differences in the chemical composition of Applicant claimed formula and the claimed mechanism of treatment. Further, the cited document is not conclusive and teaches away from Applicant claimed invention. Thus, Applicant respectfully requests that the instant invention under 35 U.S.C. 102 be withdrawn.

Applicant Response to Rejections Under 35 U.S.C. 103:

The establishment of a *prima facie* case of obviousness requires that the cited document(s) must teach or suggest all claimed elements of Applicant claimed invention, there must also be a suggestion or motivation to modify or combine references to achieve the claimed invention, and there must be a reasonable expectation of success to practice the claimed invention. Further, the cited document(s) must not teach away from Applicant claimed invention.

With the exception of claim recitations directed toward ultrasonics where Meyers (US 3,682,675) is cited as a secondary document, the rejections under 35 U.S.C. 103 are based upon the same references applied under 35 U.S.C. 102(b).

As discussed above, each of the independent claims, 54, 60 and 62, recite common elements which include, for example: hydrophilic organic solvent exothermically reacting said compound or covalently bonding said compound via *in situ* generated heat covalently bonding the solute compound to the hydroxyl groups of the wood cellulose, and molecules of said solute compound are covalently bonded to one

another. The new claims show how the use of monomers in an organic solvent clearly differentiate the technology herein from the technology in the prior art and show why the results of this reaction are so much more pronounced. The variation from neat MTS to catalysed reactions with pro-catalysts is a futher distinguishing feature, but is not necessary in view the need for the organic solvents to be hydrophilic.

As discussed above none of the cited references alone or in combination teach, disclose or suggest all of Applicant claimed elements. Therefore a *prima facie* case of obviousness does not exist. Thus, Applicant respectfully requests that all rejections under 35 U.S.C. 103 be withdrawn.

Introduction To Applicant's Traverse Of Rejections Under 35 U.S.C. 103

The instant obviousness rejections allege that it would have been obvious to one of ordinary skill in the art to optimize a cited parameter (i.e., concentration of agents in the wood, percentages of components of the claimed solution, and concentration of claimed compounds) through routine experimentation.

The cited references do not disclose, teach, suggest or motivate such experimentation; nor do they suggest the practice, or predict the likelihood of success, of Applicant claimed invention. Further, the cited documents to not disclose all claimed elements of Applicant claimed invention. None of the cited documents disclose, teach or suggest all of Applicant claimed elements which comprise:

- Hydrophilic organic solvent,
- Applicant's claimed compound,

- A process that treats a wood product with Applicant's claimed compounded reacted covalently with wood cellulose,
- Bonding to the wood cellulose covalently through one or more of the hydroxyl groups on the wood cellulose,
- Reaction between molecules of Applicant claimed compound, and
- An Exothermic reaction.

Before optimization may be considered in a rejection under 35 U.S.C. 103 a particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation (see MPEP 2144.05 (II)(B).

The cited documents do not disclose Applicant claimed elements or disclose the displacement of hydroxyl groups on wood cellulose or covalent bonding (whether with the hydroxyl group of the wood cellulose or with other claimed compound molecules) and thus such elements are not a proper basis for rejection.

The process conditions of the claims in the instant application have not been disclosed in the cited documents, i.e. the concentrations achieved with one or more molecules in the wood defined by the formulae R-Xa-Xb3 or R3-Xa-Xb, wherein R is an alkyl group, Xa is a trivalent, tetravalent or pentavalent atom, and Xb is a halogen, hydroxyl group, an alkoxy group, a phenoxy group, a benzyloxy group or an aryloxy group with a polycyclic aromatic ring in a water hydrophilic organic solvent.

Thus, these parameters are not disclosed as result-effective variables by the cited documents. The cited documents do not teach or suggest optimization, and do not predict the likelihood of success of practicing Applicant claimed invention. Thus, no *prima facie* case of obviousness exists and Applicant respectfully requests that the rejections under 35 U.S.C. 103 be withdrawn.

Saka

Claims 54, 60 and 62 rejected under 35 U.S.C. 103(a) over Saka or rejected under 35 U.S.C. 103(a) as being unpatentable over Saka in view of Meyers (US 3,682,675).

As discussed above, Saka fails to disclose all of the elements of Applicant's claimed invention. Further, Saka does not teach, motivate or suggest Applicant's claimed invention.

Saka avoids, intentionally, the use of monomers and teaches away from such a use. Saka fails to create a non-water based organic solvent. Saka fails to use acid creating pro-catalysts.

Meyers does not remedy the deficiencies of Saka (see discussion of Meyers below).

Thus, no *prima facie* case of obvious has been established and Applicant respectfully requests the withdrawal of the instant rejection under 35 U.S.C. 103.

Nasheri

Claims 60 and 62 were rejected under 35 U.S.C. 103(a) as allegedly unpatentable over Nasheri or rejected under 35 U.S.C. 103 over Nasheri in view of Meyers.

As submitted in connection with the 35 U.S.C. 102(b) rejections wherein Nasheri is cited, the Applicant's claimed invention differs from the cited documents.

The Nasheri concentrations of boric acid do not make obviousness the process claimed by Applicant, e.g., as discussed above, Applicant asserts that the boron in Nasheri is not covalently bonded to the wood cellulose in the manner claimed by Applicant and to other molecules or compounds as claimed by Applicant.

Applicant claims recite that certain additives; e.g., boron (a insect treatment); may be locked into the wood using Applicant's claimed invention which would increase the percent boron by weight, but not the percent boron reacted by weight.

This highlights a fundamental difference of Applicant's claimed invention which involves the cross linking of molecules across cellulose hydroxyl atoms with, for example, boron compounds, not the introduction of acid into the wood as is the sole outcome of the Nasheri invention. The introduction of boron in this way is considered, but only as a pre-cursor to treatment with the inventive process which would lock these boron compounds into the wood.

Meyers does not remedy the deficiencies of Nasheri (see discussion of Meyers below).

Thus, in view of the above, Applicant respectfully submits that no *prima facie* of obviousness has been established and that the instant rejection under 35 U.S.C. 103 be withdrawn.

Stabnikov

Claims 62 was rejected under 35 U.S.C. 103(a) as allegedly unpatentable over Stabnikov (see also Nasheri in view of Stabnikov).

As discussed above, neither Stabnikov nor Nasheri disclose all of Applicant claimed elements. Combination of these documents does not disclose claim recitations such as covalent bonding or exothermic reaction. As discussed above, in addition to the deficiencies in the cited disclosures, these references also teach away from Applicant's claimed invention and do not predict any likelihood of success of Applicant's claimed invention.

Thus, Applicant respectfully requests that the instant rejections under 35 U.S.C. 103 be withdrawn.

Myers

The Myers patent relates to the flame retardency of wood products, and in particular wood panels. Myers disclosed flame retardency is preferably accomplished by immersing the panel to be treated in a hot solution, and is conducted in the presence of compressional energy. Myers appears silent with regard to the mechanism by which the treating agent interacts with the wood panel, except that they are infused. Because Myers is relying upon the addition of supplemental heat and compressional energy. Generally, Meyers does not disclose a reactive event. Infusion is different from reaction.

Specifically, Meyers does not disclose Applicant claimed exothermic reaction. Myers also does not disclose the claimed exothermic process of the claimed covalent bonding via the hydroxyl groups of the cellulose.

Applicant claims the use of the chemicals covalently bonded with wood cellulose and water within the wood in order to take the un-reacted Cellulose and react them creating acid as a part of the reaction, which is optionally catalyzed utilizing acid in conjunction with the claimed compound in order to have the cellulose react within the wood generating an exothermic reaction which is self-sustaining and facilitates deep penetration of the chemicals then would be possible without the addition of pressure and heat as is taught by the cited documents. The use of undiluted catalyst (such as methyltrichlorosilane), damages the wood when used on or leaves undesirable damaging concentrations of acid or other chemicals which may leach back into the environment.

In view of the above, Applicant respectfully submits that no *prima facie* case of obviousness has been established and requests withdrawal of the instant rejection.

Supplemental Traverse

The treatments disclosed by the cited documents do not appear to use the chemistry claimed by Applicant and further disclosed in Figure 7 and in the specification. Another difference between the presently claimed invention and the disclosure of the cited documents lies in the use of cellulose and utilizing the wood as a reactant and covalently bonding Applicant claimed compounds to the cellulose of the wood itself.

Saka discloses the beginning with methyl cellulose or oxygenated cellulose or oxygenated boron gels, which are readily dissolvable utilizing organic solvents which can be injected into wood and may react with the wood utilizing high temperature and along with the possible use of acids in order to enhance the reaction.

This process occurs external to the wood and its cellulose which is ultimately treated with the dissolved gel.

Differently, the present application teaches the use of chemicals which are applied to the wood and utilizing a catalyst in the form of acid or a reactant such as a halogenated compound such as methyltrichlorosilane that are reacted in order to get the intermediary oxygenated cellulose which then immediately reacts with the hydroxide groups and the cellulose in order to polymerize the oxygen and silicon atoms in order to form chains directly on the wood cellulose.

The dramatic and non-obvious result is that instead of having to utilize energy in order to generate the reaction, the reaction itself is self propagating and will in fact generate a limited controlled heat until the entire wood is treated or until the cellulose or compounds are used up.

Instead of requiring that the oxygenated chemicals be pushed into the wood under pressure leading to imperfect or irregular saturation, the reaction pulls in the chemicals as fuel for the chemical reaction so that penetration may be obtained at a much deeper more even level.

Hence, one reason for using hydrophilic organic solvents is in order to prevent the oxygenation of the chemicals until they come in contact with the water within the wood.

Hence, while similar individual chemicals may be found in both processes, the utilization of the chemicals is so diametrically apposed as to create the difference between an endothermic and an exothermic chemical reaction.

Since penetration, even treatment and energy conservation are primary goals in wood treatment, it becomes clear that the current process was not obvious in the disclosures of the cited documents or it would have been disclosed in the manner taught in the present invention.

The use of an exothermic reaction in order to combine silanes and boron to wood cellulose does not appear to be disclosed previously.

The Court of Appeals for the Federal Circuit has long held that it is impermissible to use the claimed invention as an instruction manual or template to piece together the teachings of the prior art so that the claimed invention is rendered obvious. The Court of Appeals for the Federal Circuit has made it clear, the prior art must teach the desirability for the modification. The mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification. In re Fritch, 972 F.2d 1260, 23 U.S.P.Q. 2d 1780 (Fed. Circ. 1992), citing In re Gordon et al., 733 F.2d 900, 221 U.S.P.Q. 1125, (Fed. Cir. 1984).

The subject matter of claims may not be considered obvious as a result of a hypothetical combination of references unless something in the references suggests that an advantage may be derived from combining their teachings. In this respect, the Court of Appeals for the Federal Circuit (hereinafter CAFC) has confirmed this point in In re Fritch, 972 F.2d 1260, 23 U.S.P.Q. 2d 1780 (Fed. Circ. 1992). The CAFC has clearly and

consistently established the following mandate regarding hypothetical combinations of references:

Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. Under 35 U.S.C. 103, teachings of references can be combined only if there is some suggestion or incentive to do so. ACS Hosp. Systems, Inc. v. Montefiore Hosp., 732 F.2d 1572, 221 U.S.P.Q. 929 (Fed. Cir. 1984).

The CAFC has held that an Examiner should not rely upon hindsight to arrive at a determination of obviousness. It is impermissible to use the claimed invention as an instruction manual or template to piece together the teachings of the prior art so that the claimed invention is rendered obvious. One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention. In re Fritch, 972 F.2d 1260, 23 U.S.P.Q. 2d 1780 (Fed. Circ. 1992), citing In re Fine, 837 F.2d 1071, 5 U.S.P.Q. 2d 1596 (Fed. Cir. 1988).

In view of the above, Applicant respectfully submits that no *prima facie* case of obviousness exists. None of the cited documents, whether alone or in combination, teach or suggest all claimed elements of Applicant claimed invention. There is also no suggestion or motivation to modify or combine references to achieve Applicant claimed invention, and no reasonable expectation of success to practice Applicant claimed invention is provided. Thus, Applicant respectfully request that all of the rejections set forth under 35 U.S.C. 103 be withdrawn.

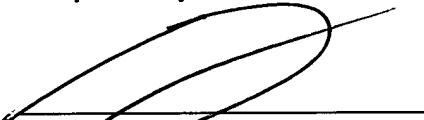
CONCLUSION

In view of the above, Applicant respectfully submits that no *prima facie* case of anticipation or obviousness exists and that the application is in condition for allowance. Applicant respectfully request the withdrawal of all rejections set forth under 35 U.S.C. 102 and 35 U.S.C. 103 and allowance of this application.

AUTHORIZATION

The Commissioner is hereby authorized to charge any fees which may be required for timely consideration of this Preliminary Amendment, or credit any overpayment to Deposit Account No. 06-2129.

Respectfully submitted,


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